to which confidential information and inquiries may be directed in the first efforts to establish and conduct that conjoint scientific work which such co-operation of kindred trades will require.

Turning, then, to that section of the report which deals with the sphere of the universities and technical colleges in relation to scientific research, we find the same absence of positive constructive suggestions for reform as in other portions of the report. The defects or deficiencies of our present conditions are pointed out, but the remedies for them only indicated in the most nebulous manner. It is stated with great truth that "the universities can and must be the main sources of research in pure science, the discoveries in which lie at the root of all practical and technical applications." But no definite recommendations are made as to how this output is to be increased.

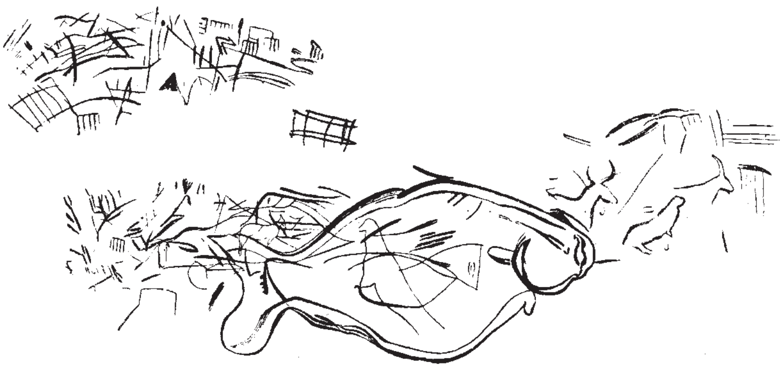
It should be clearly recognised that effective research work of a high class demands a continuity of effort and time which it is in many cases almost impossible to obtain for university teachers. A man who has to drop his observations or experiments at a critical moment to go off and give a lecture or attend a committee or superintend a laboratory class is not placed under conditions in which the best work can be done. On the other hand, there are many men who are admirable and capable as teachers and as college administrators who have not the gifts of originality which make them shine as investigators. The only way out of this difficulty is to separate the functions more clearly. Every university should have research professorships and chairs, the occupants of which should have as their principal work to enlarge the bounds of knowledge in their particular subject.

The report does not furnish us with any definite proposals for the establishment of such research scholarships, fellowships, or professorships, but confines itself to the enunciation of broad and general aspirations in this respect. The universities will have suffered greatly by the close of the war in the loss of many of their most promising and talented students and teachers whose valuable lives have been given in the service of their country. We have to make provision for the careful cultivation of originality and research power in those who remain or return, and it would therefore have been much to the point if we could have found in this report a carefully-considered programme with this object in view. We think that many who study the report will feel disappointed that it does not contain more definite pronouncements of constructive policy in place of generalities. Much of it has the tone of an able article written for a leading monthly magazine rather than the enunciation of the matured conclusions and decisions on the part of a Government-appointed Committee recording the results of more than a year's consideration of this vital subject. Time presses, and our national position now demands vigorous and well-determined action rather than leisurely and academic discussion of our needs.

J. A. F.

THE ART OF THE CAVE.[1]

In "La Pileta" a further considerable contribution is made to our knowledge of the Jurassic caves of South-west Europe by Abbé Breuil, in collaboration with Dr. Obermaier and Col. Willoughby Verner. The cave, which takes its name from the hill in which it is found, is, with its various corridors, recesses, and "galeries," more than usually complicated, and in fact at certain periods it provides accommodation for a stream and a lake. Wherever the cave opens out to form a chamber, wall paintings are to be seen, and it is these paintings which constitute the chief interest of the cave. The paintings comprise examples of four separate pictorial phases. The earliest are yellow in colour, and consist largely of serpentine forms with an occasional realistic figure of a goat, ox, or horse. The second series in chronological order is red in colour, and here, in addition to animal forms, are to be found various signs or symbols—recurrent dots, lines, spirals, ovoid figures, "claviformes" and "tectiformes." These are followed by a series drawn with charcoal, in which forms of animals naturalistically treated largely predominate, among them, be it noted, in considerable numbers the figures of fish—a new feature in parietal art, as the authors point out. With these are interspersed serpentine forms and schematic figures of animals. It is among these last figures that the authors believe they can recognise figures intended for human beings, and that an attempt has even been made to indicate the sex. The fourth and last series is purely schematic, and comprises geometrical figures with little or no zoomorphic or anthropomorphic suggestion. The vast majority of the figures are pectiniform, the number of teeth and the orientation of the backs of the combs exhibit-



Panneau No. 49, dit du grand Poisson. From "La Pileta."

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[1] "La Pileta à Benaojan (Malaga) (Espagne)." Par l'Abbé H. Breuil, Dr. H. Obermaier, et Col. Willoughby Verner. Pp. 65+plates i-xxi. (Monaco: A. Chêne, 1915.)

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ing a wide variation. In several cases the combs are combined to form composite figures. In the opinion of the authors the four phases represented extended over a long period, from Aurignacian to Neolithic times. The pictures are, although inferior in execution, closely related to those of Altamira, Niaux, and Font de Gaume, while the signs and symbols follow closely the rock engravings of Portuguese South-east Africa.

The most outstanding feature is the appearance of fish among the animal forms. The fish represented are of the Plaice or Brill family, and form the only instance so far known of fish painted on the walls of a cave, although engravings of fish have been reported from Pindal, Niaux, and "La Gorge d'Enfer." The book is admirably illustrated, and maintains in every way the high level which we have come to associate with the publications of the Institut de Paléontologie Humaine de Monaco.

WILLIAM WRIGHT.

BACTERIOLOGICAL RESEARCH IN BOMBAY.

THE report of the Bombay Bacteriological Laboratory for the year 1914, by Major W. Glen Liston, reached this country recently. The report is divided into two parts: (1) that dealing with plague work, and (2) that dealing with general preventive medicine. Statistics are furnished which tend to show that the uninoculated are attacked three times more frequently than the inoculated (against plague). One drawback to the use of plague vaccines is the severe reaction which follows, deterring others from undergoing the operation. It is now suggested, as results of experiments on rats and observations on man, that a small initial dose of 1–2 c.c. should be given, to be followed in a week by a second dose of 2–4 c.c. It appears that there are two other species of fleas of the genus Xenopsylla—viz., *X. brasiliensis* and *X. astia*—besides the originally known species *X. cheopis,* which, however, forms 80 per cent. of the three species concerned. Whether they all transmit plague is a question which must arise. The results of the examination of rats in the laboratory show that both in the case of *M. rattus* and *M. decumanus* there is a rise above the mean in the rate of infection in the latter half of January, whereas the rise above the mean in human plague mortality occurs in the first half of March. The fall below the mean occurs at the same time for both species of rats and for man—viz., in the first half of June. The summit of the infection for *M. rattus* precedes that of *M. decumanus* by a fortnight, while the infection of the latter and the mortality in man reach their maximum at the same time—viz., in the latter half of April.

It is disheartening to see in connection with the prevalence of guinea worm in the town of Ranebennur that years have passed in a fruitless discussion of various plans to improve the water supply of this town. The guinea worm infection is 1·45 per cent. In the village of Desai it is calculated that the extermination of guinea worm would result in a net gain of 219 rupees per annum. Here, as elsewhere, sanitation always means a net cash gain in the end. The nature of rat-bite fever is unknown, but the fact that salvarsan rapidly cures it suggests a spirochæte origin. A "number of cases" came under observation; but why not state the actual number? The report, though short, contains much of interest and evidence of good, sound work.

J. W. W. S.

NOTES.

WE record with deep regret the death on September 16, in his seventy-third year, of Sir Lauder Brunton, Bt., F.R.S., consulting physician to St. Bartholomew's Hospital, and of high distinction by his work and teaching in physiological medicine.

WE regret to see in the *Morning Post* the announcement of the death of Prof. Pierre Duhem, professor of theoretical physics in the University of Bordeaux, and the author of several works of wide interest on the history of natural philosophy and physical subjects.

ONE of the incidental effects of the European war upon America is the stimulus it has given to the adoption of the metric system. Very many American factories now turning out munitions for the Allies are working almost entirely in metric dimensions. Even locomotives are being manufactured in metres and millimetres. "The same thing, in all likelihood," says the New York *Evening Post,* "is taking place in England, which is furnishing munitions for Russia and other of her Allies."

A NEW YORK telegram announces the death on September 18, at sixty-six years of age, of Mr Seth Low, president of Columbia College from 1889 to 1901, during which period the college became Columbia University. Referring to his work for the university, the *Times* says: "He did much by his businesslike administration, his liberality (he personally contributed 200,000*l.* to the fund which enabled it to be removed to its magnificent site on Morningside Heights, New York City), and his especial interest in the department of political science."

THE Sociedad Argentina de Ciencias Naturales, of Buenos Aires, which issues the journal *Physis,* has arranged to hold meetings similar to those of the British Association, every two years, in one of the towns of the Argentine. No scientific assembly of this kind has hitherto been held in South America. The first meeting will be held at Tucuman in the last week of November next, in commemoration of the first centenary of the declaration of the independence of the Argentine Republic in 1816. Tucuman is the busiest and most populous town in the north of the republic. It possesses a university, a Museum of Natural History, of which Prof. M. Lillo is director, two agricultural experiment stations, and other institutions of scientific interest. The Governor of the State, Don Ernesto Padilla, is honorary president of the local committee for the meeting. The president of the whole assembly will be Prof. A. Gallardo, director of the Buenos Aires Museum; and the Minister of Public Instruction will be the honorary president. There will be nine sections, which, with their presidents, will be as follows:—I., Geology, Geography, and Geophysics, M. Enrique Hermitte; II., Palæontology, M. Carlos Ameghino; III., Botany, Prof. C. M. Hicken; IV.,

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